

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 9 of 14

REMARKS/ARGUMENTS

Claims 1-23 and 30-35 are pending in this application. By this amendment, Applicants amend claims 1, 13 and 20-23 and add new claims 30-35.

Claims 1-5, 8-17 and 20-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. (U.S. 2002/0180035) in view of Weber (U.S. 5,609,889). Claims 6 and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Weber, and further in view of Punzalan et al. (U.S. 2003/0160309). Claims 7 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Weber, and further in view of Cheng et al. (U.S. 2003/0075812). Applicants respectfully traverse the rejections of claims 1-23.

Claim 1 has been amended to recite:

"A process for manufacturing an integrated circuit package comprising:

mounting a semiconductor die to a first surface of a substrate;
mounting a die adapter to said semiconductor die;
wire bonding said semiconductor die to ones of conductive traces at said first surface of said substrate;

mounting at least one collapsible spacer to at least one of a heat spreader, said die adapter and said substrate;
placing one of said heat spreader and said substrate on a surface of a lower mold die;

releasably clamping the other of said heat spreader and said substrate to an upper mold die, such that said other of said heat spreader and said substrate is in contact with said upper mold die and said collapsible spacer is disposed between said heat spreader and said substrate;

molding the semiconductor die, the substrate, the wire bonds, said die adapter, said at least one collapsible spacer and said heat spreader into a molding compound by molding in a mold cavity between said other of said heat spreader and said substrate and said surface of the lower mold die, resulting in a molded package having at least a portion of said substrate exposed and at least a portion of said heat spreader exposed from said molded package;

forming a ball grid array on a second surface of said substrate, bumps of said ball grid array being electrically connected to said conductive traces; and

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 10 of 14

singulating said integrated circuit package." (emphasis added)

Claim 13 recites features and method steps that are similar to the features and method steps recited in claim 1, including the above-emphasized features.

In the Advisory Action dated February 3, 2005, the Examiner alleged that both Huang et al. and Weber disclose "placing the substrate on a surface of a lower mold with molding material between either the heat sink and the lower die or the substrate and the lower die."

Claim 1 has been amended to recite the features of "releasably clamping the other of said heat spreader and said substrate array to an upper mold die, such that said other of said heat spreader and said substrate is in contact with said upper mold die" and "molding the semiconductor die, the substrate array, the wire bonds and said heat spreader into a mold material by molding in a mold cavity between said other of the heat spreader and said substrate array and said surface of the lower mold die, resulting in a molded package having at least a portion of said substrate exposed and at least a portion of said heat spreader exposed from said molded package" (emphasis added). Claim 13 has been similarly amended.

Huang et al. clearly teaches away from having one of the heat spreader and the substrate disposed on the surface of the lower mold die with the other of the heat spreader and the substrate in contact with a surface of the upper mold die. Thus, the molding performed in Huang et al. does not result in a molded package having at least a portion of a substrate and at least a portion of the heat spreader that is exposed, and instead results in a molded package in which the heat spreader (heat sink module plate 23A) is completely covered by the gold layer 233A, and no portion thereof is exposed.

As previously argued in the Request for Reconsideration filed on January 13, 2005, Huang et al. clearly teaches away from the present invention. Huang et al. specifically discloses that the heat sink 23A must be spaced away from the top wall of the mold cavity.

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 11 of 14

Particularly, page 3, paragraph [0036] of Huang et al. discloses that "the combined structure of the heat sink module plate 23A, the chips 21 and the substrate module plate 20A is placed in the mold cavity for performing a molding process, which is used to form an encapsulant 24 for encapsulating the heat sink module plate 23A, the chips 21, the gold wires 22 and the substrate module plate 20A. As the combined structure is dimensioned for the gold layer 233A on the heat sink module plate 23A to be properly spaced from the top wall of the mold cavity after the engagement of the molds, no cracks caused by clamping force from the molds or the heat sink module plate 23 will be generated for the chips 21. Further, as there is no concern for precisely controlling the height of the attachment of the heat sink module plate 23A to the chips, quality and reliability of the fabricated product can be assured."

Thus, Huang et al. not only fails to teach a step of placing one of the heat spreader and the substrate on a surface of the lower mold die while the other of the heat spreader and the substrate is in contact with the surface of the upper mold die, but Huang et al. teaches that the combined structure must be dimensioned for the gold layer on the heat sink to be spaced from the top wall of the mold cavity and away from contact with the mold cavity after engagement of the molds. Thus, Huang et al. teaches that a space between the heat sink and the upper mold die is important and must be present. Thus, Huang et al. clearly teaches away from Applicants' claims 1 and 13.

The Examiner is reminded that it is error to find obviousness where references diverge and teach away from the invention at hand. W.L. Gore & Assoc. v. Garlock Inc., 220 USPQ 303, 311 (Fed. Cir. 1983).

Thus, since Huang et al. clearly and specifically teaches away from the features of "releasably clamping the other of said heat spreader and said substrate array to an upper mold die, such that said other of said heat spreader and said substrate is in contact with said upper mold die" and "molding the semiconductor die, the substrate array, the wire bonds and said heat spreader into a mold material by molding in a mold cavity between said other of the heat spreader and said substrate array and said

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 12 of 14

surface of the lower mold die, resulting in a molded package having at least a portion of said substrate exposed and at least a portion of said heat spreader exposed from said molded package" (emphasis added) as recited in claim 1, and similarly in claim 13, Applicants respectfully submit that there would have been absolutely no motivation to combine the teaches of Weber with Huang et al., as alleged by the Examiner.

Furthermore, it clearly would not have been obvious to modify Huang et al. as allegedly taught by Weber for the purpose of preventing the molding material from covering the heat sink, as alleged by the Examiner, because Huang et al. specifically teaches the importance of dimensioning the package and molds such that the gold layer 233 and the heat sink module plate 23A are spaced from the top of the mold.

Instead of basing the conclusion of obviousness on actual teachings or suggestions of the prior art and the knowledge of one of ordinary skill in the art at the time the invention was made, the Examiner has improperly used Applicants' own invention as a guide. It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious. The Federal Circuit has previously stated that one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. In re Fritch, 972 F.2d 1260, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992).

It is impermissible within the framework of § 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. In re Wesslau, 353 F.2d 238, 241, 147 USPQ 391 (CCPA 1965). The Examiner has clearly done so by ignoring the specific teachings in Huang et al. which clearly preclude any modification of the method of Huang et al. that would include the step taught by Weber.

With respect to the Examiner's allegation that adhesive of Huang et al. is

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 13 of 14

collapsible or compressible by nature and occupies space, and is therefore, a collapsible spacer, Applicants respectfully disagree.

The adhesive of Huang et al. clearly does not act as a collapsible spacer as alleged by the Examiner, since, as described above, Huang et al. specifically teaches that a space must be left between the heat sink module plate 23A and the top wall of the mold cavity to avoid any cracks caused by clamping force from the molds and to avoid having to precisely control the height of the attachment of the heat sink module plate 23A to the chips 21. If, in fact, the adhesive of Huang et al. did act as a collapsible spacer, as alleged by the Examiner, there would be no need to properly space the heat sink module 23A from the top wall of the mold cavity.

Thus, Applicants respectfully submit that, contrary to the Examiner's allegations, the adhesive of Huang et al. does not act as a collapsible spacer, and that Huang et al. fails to teach or suggest any element or feature which can be fairly construed as at least one collapsible spacer that is mounted to at least one of a heat spreader, said die adapter and said substrate as recited in Applicants' claim 1, and similarly in Applicants' claim 13.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Huang et al. in view of Weber.

The Examiner has relied upon Punzalan et al. and Cheng et al. to allegedly cure various deficiencies of Huang et al. and Weber. However, neither Punzalan et al. nor Cheng et al. teaches or suggests the steps of "mounting at least one collapsible spacer to at least one of a heat spreader, said die adapter and said substrate," "releasably clamping the other of said heat spreader and said substrate to an upper mold die, such that said other of said heat spreader and said substrate is in contact with said upper mold die and said collapsible spacer is disposed between said heat spreader and said substrate" and "molding the semiconductor die, the substrate, the wire bonds, said die adapter, said at least one collapsible spacer and said heat spreader into a molding

Serial No. 10/643,961
February 15, 2005
Reply to the Office Action dated November 15, 2004
Page 14 of 14

compound by molding in a mold cavity between said other of said heat spreader and said substrate and said surface of the lower mold die, resulting in a molded package having at least a portion of said substrate exposed and at least a portion of said heat spreader exposed from said molded package" as recited in Applicants' claims 1 and 13.

Accordingly, Applicants respectfully submit that Huang et al., Weber, Punzalan et al. and Cheng et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of method steps and features recited in Applicants' claims 1 and 13.

In view of the foregoing remarks, Applicants respectfully submit that Claims 1 and 13 are allowable. Claims 2-12, 14-23 and 30-35 depend upon claims 1 and 13, and are therefore allowable for at least the reasons that claims 1 and 13 are allowable.

In view of the foregoing remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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Attorneys for Applicant

Joseph R. Keating
Registration No. 37,368

Christopher A. Bennett
Registration No. 46,710

KEATING & BENNETT LLP
10400 Eaton Place, Suite 312
Fairfax, VA 22030
Telephone: (703) 385-5200
Facsimile: (703) 385-5080